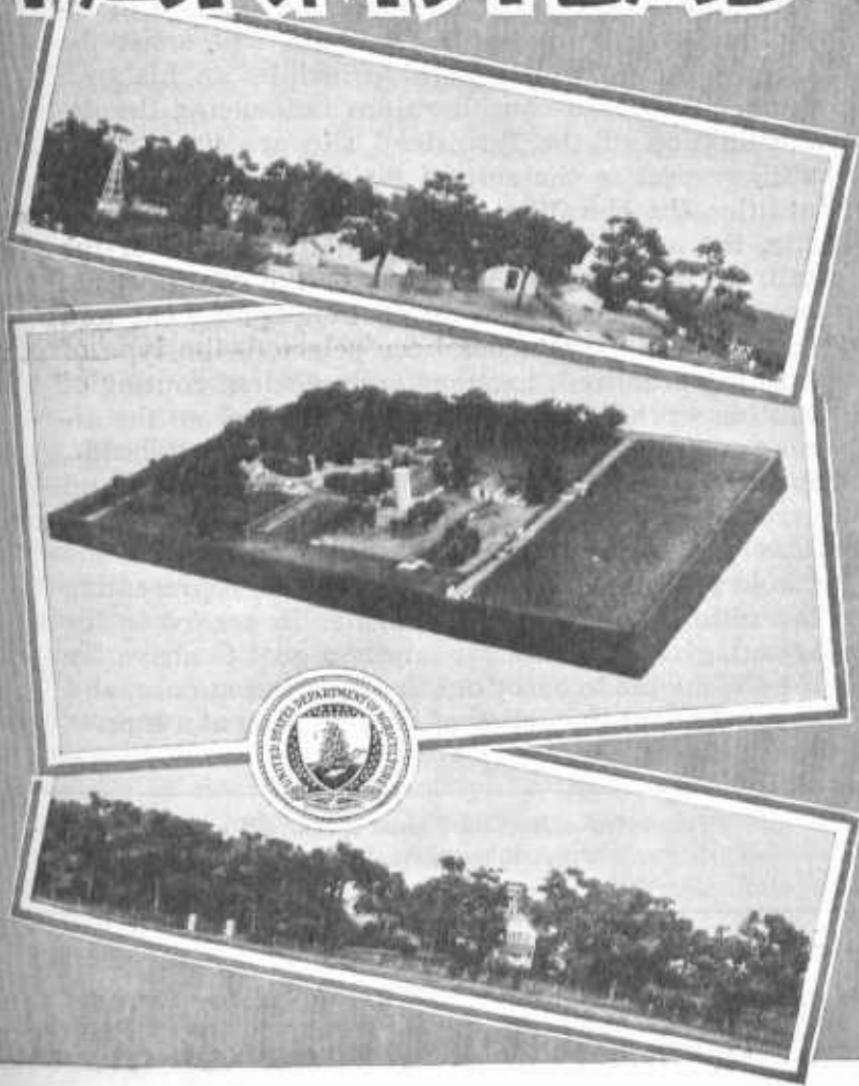


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FARMERS' BULLETIN 1132  
UNITED STATES DEPARTMENT OF AGRICULTURE

# PLANNING *the* **FARMSTEAD**



**T**HE OBJECT of this bulletin is to set forth general principles involved in planning the arrangement of the buildings of the farmstead in their relation to one another. These principles of good planning are illustrated by application to a farmstead of a type common to the Middle West. It is not possible to treat all types of farms or all of the number of varying conditions that influence the solution of individual problems, but the bulletin will assist the farmer in applying general principles to his own farm. The main considerations influencing the determination of the farmstead site are its location with respect to the rest of the farm and to public utilities, the elevation and drainage of the proposed site, the available water supply, the nature of the soil, the relation to the points of the compass, the prevailing breezes and protection from heat and cold. After the site has been selected, the type of farming practiced, together with efficient routing of routine work, have an important bearing on the arrangement of the various buildings. It is advisable, in order to secure the best results in locating and arranging the farmstead, to study the plan on paper. This procedure assists in the visualization of the whole scheme and the completed plan, representing the ultimate desire of the farmer in regard to his layout, gives him and his family a goal to strive for if he is unable to carry out the full plan at once, and so must adopt the policy of doing a little at a time.

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Contribution from the Bureau of Public Roads

THOS. H. MacDONALD, Chief

Washington, D. C.

August, 1920

# PLANNING THE FARMSTEAD.

M. C. BETTS and W. R. HUMPHRIES,  
*Division of Rural Engineering, Bureau of Public Roads.*

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FARMING is a business, just as is the manufacture of automobiles or any other industrial activity. The successful farmer must be a good manager, and the better his management the greater his success. While a good manager may accomplish much with poor equipment, he can do much more if his plant and equipment are properly designed and arranged.

Under existing economic conditions, namely, the increasing price of land, equipment, machinery, etc., and the scarcity and high price of labor, it is necessary to increase the output while maintaining the same unit cost of production, or to lower the cost of production, in order to secure an adequate return upon capital invested in farms under normal conditions of supply and demand. If a lowering of cost and increased production can be secured at the same time, so much the better.

In most manufacturing lines, and in agriculture as well, quality is as productive of return as is quantity; an improvement in working conditions which permits an increase in the volume of work accomplished may perhaps be utilized to secure an improvement in quality of product, since under the same conditions it is possible to put more time on any given piece of work.

The farmer who desires to obtain the greatest possible results from his operations, whether he be already established or just entering upon his venture, may profit by the example of some of our successful industrial establishments, where, in order to reduce cost of pro-

duction or to increase the output, whole plants have been remodeled or entirely new plants erected, all carefully arranged and equipped to meet the particular requirements of the work to be done.

Very few established farmers are in a position to tear down all their old structures, and to build entirely anew, or to move to a new location, but a great many farms can be improved by moving or remodeling some of the buildings in order to save the time and energy of the workmen in the performance of routine work. There are other considerations which enter into the problem of increasing farm production, such as the installation of proper machinery, the development of natural power resources, where available, in order to save man and animal power, and the use of the best methods of crop growing and marketing; but these are aside from the question of planning the farmstead.

Certain well-founded principles are involved in the planning of an industrial establishment, which apply as well to the laying out of a farm plant, and there are others which are peculiar to the farm problem. It is the purpose of this bulletin to explain the principles affecting the farm layout by applying them to given problems. It is not possible to develop a plan having general application, because the conditions to be met in each case vary, though the principles to be observed remain the same. The location of the farm with reference to highways and town, the topography of the land, the climatic and soil conditions, and the type of farming to be undertaken all have their influence on the location of the farmstead and the arrangement and design of the buildings.

### THE FARMSTEAD.

The planning of a farmstead layout involves the arrangement of the various buildings, yards, lots, etc., with relation each to the other, to the fields and to the highway, in such manner that there shall be a minimum of time consumed, no retracing of steps, and no lost motion in executing the routine work of the farm. It includes the designing of each building or other unit for the particular purpose for which it is intended, and its location with reference to its functional relation to other units. It means the creation of a practical business establishment in combination with a home which must be attractive and inspiring to its occupants if the best is to be had out of farm life.

It is not within the scope of this bulletin to take up the details of the designing of the various farm buildings, but it may be said that in planning the structures of the business or producing part of the establishment consideration must be given to the question of return on the investment. Pleasing architectural effects, tempered with

economy in materials and construction, should be sought in the designing of the buildings, such as barns, stables, and the smaller structures, but the first consideration is that of utility.

The farmhouse is another problem. Here utility, while of prime importance, is not or should not be the only determining factor. The amount of money invested in a house should be such that the net income of the farm can easily take care of the interest, if interest must be paid, without too great restriction upon other expenses. Within this limit, the farm home should have all the conveniences and comforts possible, and should be as attractive in design and surroundings as it can be made.

Where ample capital is available, all permanent buildings and equipment as a sound business proposition should be of the best materials and of substantial construction. The farmhouse, however, should be more than well built; it should provide ample accommodations for those it is to shelter; it should be well lighted and warm; it should have all the conveniences and labor-saving devices possible in order that the housework be reduced to a minimum, and it should be furnished in good taste. The cost should not be viewed as a financial investment upon which the farm business must pay full interest. Money judiciously expended on the farm home earns a return that is not to be measured in cash. A sense of pride in the ownership of an attractive abode; the physical well-being of those enjoying a healthy, wholesome, and happy family life; the effect of pleasing surroundings which, though rather intangible, is reflected in the contentment and loyalty of those concerned in the maintenance of the home, constitute a return which, while indeterminate, has a monetary value. A pleasant farm home life affects the business of the farm in many ways, all tending to increase returns on the business investment.

Careful arrangement of the farmstead and intelligent planning of the farm buildings is good business under any circumstances, but it is especially important when capital is limited and must be made to go a long way. When such is the case the farm business plant must be first considered, but the ultimate farm home should be planned for with the rest of the farmstead. Possessed of the plans for an attractive home, the farm family has something toward which to work, an incentive to thrift and economy in the operation of the farm, and a tie to farm and home life not easily broken.

## PLANNING THE FARMSTEAD.

### SELECTING THE SITE.

The established farmer who contemplates improving the working facilities of his farm must take conditions as they are, and remodel, tear down, or move, as may be necessary or advisable. When unim-

proved land is to be developed, the purchaser usually gives consideration to its suitability to the business he intends to pursue, the character of the soil, the lay of the land, the accessibility of markets for his products, etc., but a very vital consideration is frequently overlooked, namely, a suitable location for the farmstead.

Much of the success of the farmstead plan depends upon the care expended upon selecting the location. This is not always a simple matter, because the features that influence a choice of location are numerous and often conflicting. Of the more important considerations there may be mentioned location with respect to the rest of the farm and to public utilities, elevation and drainage, water supply, nature of soil, orientation, prevailing breezes, and protection from heat and cold.

#### LOCATION WITH RESPECT TO REST OF FARM AND TO PUBLIC UTILITIES.

In determining the location of the farmstead, careful consideration should be given to the arrangement of the fields. This is influenced by the topography of the land, drainage, soil conditions, location of natural pasturage, cropping scheme, etc. Ease of access to the fields from the buildings is highly desirable, as otherwise loss of time due to inconvenience will be incurred. This consideration has, of course, less significance on the small than on the large farm where the buildings must be somewhat centralized in order to insure economy of operation.

Figure 1 is suggestive of a layout in which the distance from the buildings to the fields has been reduced practically to a minimum. Such a scheme is economical (1) in time consumed traveling to and from fields with implements or in driving stock; (2) in supplying the fields with water for the animals (from a central supply); (3) in fencing, as no long lanes are necessary. As a general thing long lanes and the consequent additional fencing constitute an economic loss. If direct access to the farmstead from two or more fields is desired, other conditions permitting, the farmstead may be moved east or west to the corner of field E. This gives direct access to four fields, with no increase in the amount of fencing or pipe lines, and also avoids dividing field E by the approach from the highway.

A farmstead so located does not possess certain advantages arising from a closer relation to the highway. Traffic is a source of considerable interest to the average farm family. The ability to observe at close range or to hail those passing on the road tends to promote social intercourse and participation in community affairs. A layout such as shown in figure 1 is particularly applicable to the farm north of a highway, since a dwelling on a farmstead close to that side of the road is subjected to the dust blown by southern winds. A farm-

stead situated a considerable distance from the road is not subject to this nuisance.

The advantages obtained in locating a farmstead at sectional cross-roads often justify the selection of such a site. In figure 2 a cross-roads site is shown. Town, railroad, school, church, etc., may all be so located that this corner of the farm is nearest to them. If more important considerations do not conflict, this condition might well warrant such an arrangement, since there would be a considera-

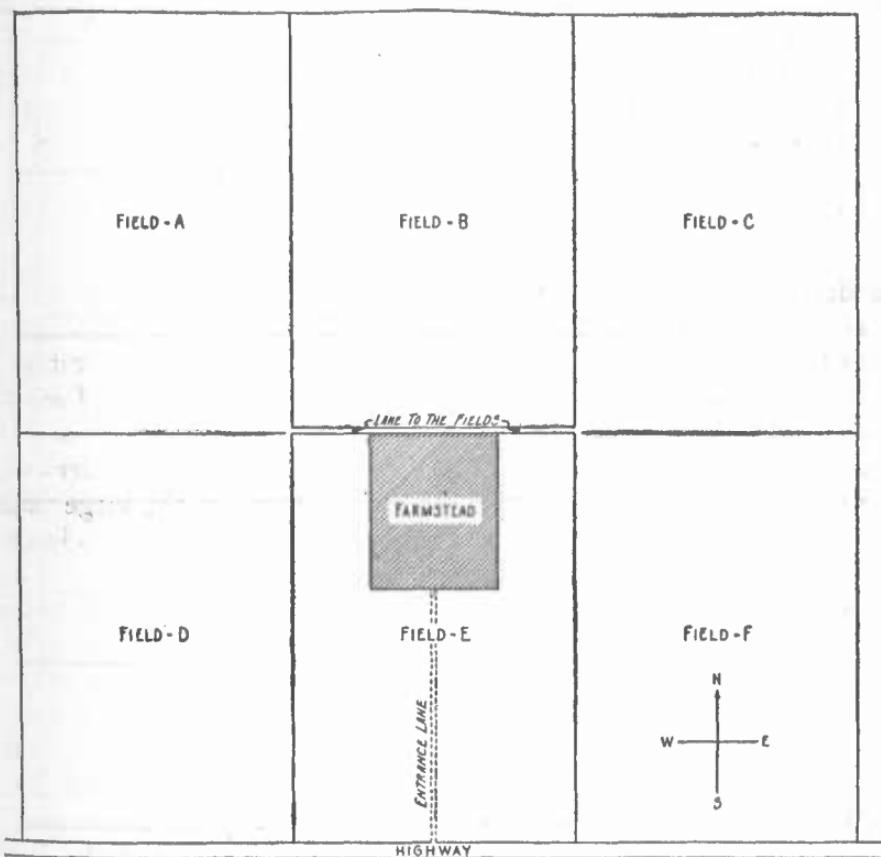


FIG. 1.—Economical relation of farmstead to fields.

ble saving of time in traveling to and from the farm. Quick access to both highways is advantageous. Live stock and farm traffic can be handled through the rear entrance, thus leaving the dwelling and grounds free of the farm business. Frequently the back lane is a short cut to the destination.

The relationship of farmstead to farm is often influenced by farm practice. Figure 3 shows a layout which provides for a minor pasture rotation for hogs, in addition to the rotation of general farm crops. A 3-field rotation is indicated, and in arranging the buildings on the farmstead, the hoghouse, yards, etc., should be so placed that the hogs may be driven readily to and from the small fields.

## ELEVATION AND DRAINAGE.

The wise purchaser selects land suited to his purpose, but generally having a moderate elevation with a slope to the south and east, neither so high as to be difficult of access, nor so low as to be damp, subject to frost, poor drainage, and lack of air circulation. This is essential to the production of the best crops, but it is of

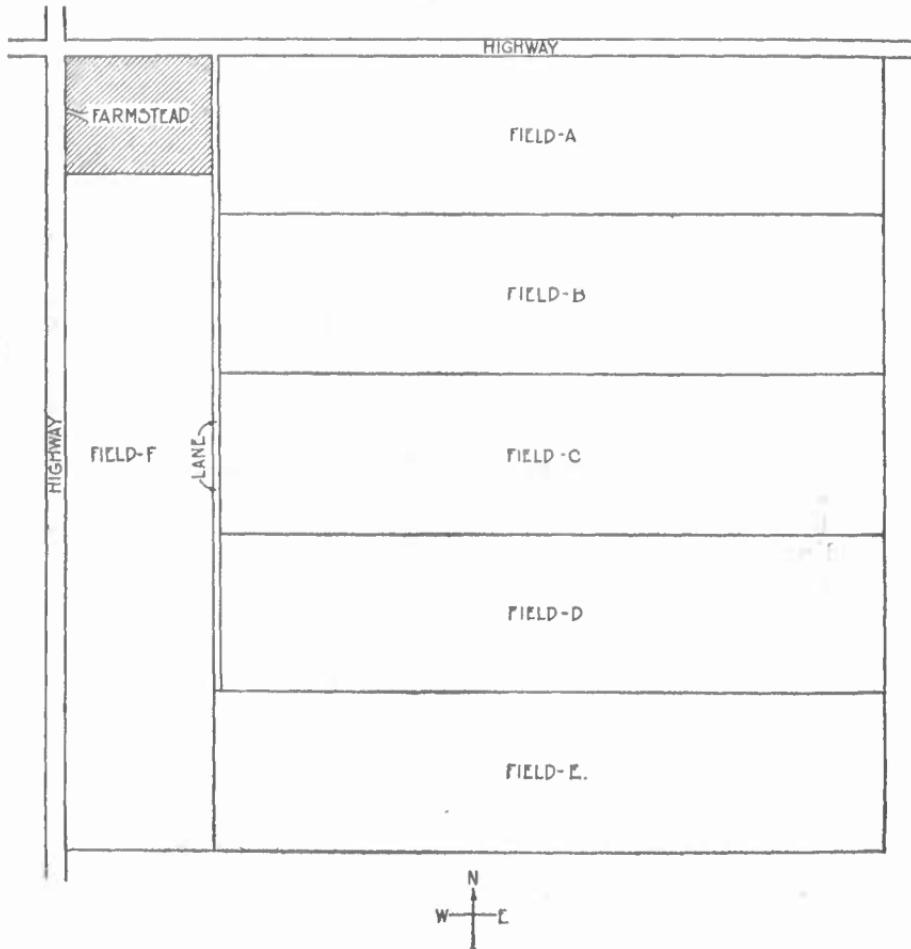


FIG. 2.—Location of farm at cross roads.

greater moment with respect to the good health of the family, than which there is no more valuable asset on the farm.

It is of great importance that the farmstead site have a slope, in one or more directions, sufficient to carry off all surface water from about the buildings and yards. Good drainage about the farmstead insures dry floors and comparatively dry paths and driveways, making it easier to get around in bad weather. For this reason a knoll or hillside with moderate slope should be sought. Frequently an otherwise desirable site may not have perfect drainage, in which

case a little filling, ditching, or tiling may correct the fault. The ground around a well-or about the stock yards may need some such treatment. Much of the sickness on farms may be attributed to the seepage of foul water into the wells, a condition which, in many instances, may be corrected by proper grading and curbing.

Cattle are more comfortable and no doubt put on weight more readily in a dry, hard yard than in one which is "knee deep" in mud. The liquid manure from a graded yard may be saved by



FIG. 3.—Arrangement for a three field hog pasture rotation.

draining the yard to a masonry pit or sump hole. Paving the barn yard with concrete conserves the manure to an extent which should offset the cost of paving in a comparatively short time.

#### WATER SUPPLY.

Frequently the buildings and yards may be so located that water from a spring, well, or infiltration gallery can be delivered by gravity, and such a system is ideal. Other things being favorable, it may be well to locate the farmstead so as to take advantage of

this, but water may be pumped with comparatively little expense from any reasonably distant source, and the advantages afforded by another location with respect to drainage and the arrangement of buildings, yards, etc., may be of greater value than that of a gravity water supply.

#### NATURE OF SOIL.

The garden, lawn, orchard, and windbreak, constituting a considerable portion of the farmstead, require good and preferably light soil, while the ground occupied by the farm buildings may be the poorest land on the farm. Not infrequently the two kinds of soil may be found within the farmstead area, but it is better to sacrifice a little crop-producing land for the buildings than to handicap the garden or orchard with poor soil. Sandy or gravelly soils are excellent for general farmstead purposes, as they are favorable for plant growth and drain rapidly—very desirable qualities. While good soil within the farmstead should be sought, still, because of its crop-producing value, it should not be wasted in yards, lots, and lanes; in other words, the farmstead should be made as small and compact as possible without affecting the efficiency or attractiveness of the layout.

#### ORIENTATION.

The points of the compass have an important bearing on the proper arrangement of the buildings on the farmstead, and it is well to keep this in mind when purchasing farm land or in selecting a site for and planning the farm buildings. Sunlight is one of the most potent enemies of dirt and disease. Germs do not thrive in sunlight, and dirt is more readily detected in a bright, cheery room than in one that is dark and dreary. It is very desirable, therefore, that all shelters of human and animal life receive the utmost benefit of the sun's rays during the winter and of the cooling breezes in the summer time. The principle of orientation is the arranging of the various parts of a building so that this end may be attained.

The average home builder wants his home to face the road, meaning that the principal rooms and the main entrance, not necessarily the entrance most used, look out upon and are in evidence from the highway. This tendency frequently produces unfortunate results, as in the case of a house situated south of a road running east and west. In this position the principal rooms are toward the north; they lack the cheerfulness imparted by the winter sun, are more difficult to heat in winter, and do not get the benefit of summer breezes.

It often happens, too, that by adhering to this general practice a pleasing landscape picture is lost to view from the living portion of the house. While the existence of an attractive view in a certain

direction does not warrant the sacrificeing of important features in the farmhouse plan, yet in order that it may be enjoyed from the front porch or the living room window, the point is worthy of careful consideration. The beauties of nature take hold of the most rugged and practical minds, and have an important part in the attachment which everyone has for his home.

If a farmhouse is situated near the road, it is generally best to place it four square to the highway, but if it is placed fairly well back, there is no reason why it should not be set at almost any angle in order to secure the best results.

The sun's course must also be considered in connection with the planning of the stock shelters and yards. For instance; barns for stock should be placed with their long axes north and south so as to give either side the benefit of the sun for one-half day, and also to allow cooling summer breezes to blow through the buildings.

#### PREVAILING BREEZES AND PROTECTION FROM HEAT AND COLD.

As a rule, throughout the Middle West, the prevailing summer breezes are from the south, southwest, and west, although in certain localities topographic conditions may cause a variation from this generality. Cold winds and snow sweeping over the farm, unchecked by hills or trees, cause general discomfort to man and beast. Stock in unprotected lots and fields expend a great deal of energy in moving about to find a comfortable spot, and do not gain in weight as rapidly as when protected from cold winds. It requires a great deal more fuel to warm a house that is exposed than one that has a measure of protection.

For this reason, it is desirable to select a site having a south and southeast slope, or one in which existing trees form a natural wind-break, as it requires many years to grow an effective protection. If the locality is without hills or other natural windbreak, a shelter belt of trees should be planted to the north and west of the farmstead. The trees should be selected with reference to nativity, height, density and rapidity of growth, ability to resist wind, and commercial value. It is a good plan to plant rapid-growth trees of the less desirable varieties along with permanent planting. In this way, protection is secured quickly, and when the hardier trees have acquired growth, the others may be cut out. The permanent planting should include a goodly proportion of evergreen trees.

Buildings form more efficient windbreaks than do trees and hills and, therefore, should be so placed that they will act as windbreaks to the yards at the same time being open to the sun. Board fences also are valuable in sheltering yards from cold winds.

During the summer months barnyard odors are an annoyance. If the outbuildings are placed to the north or east of the dwelling, the prevailing breezes will carry the odors away from the house. Relief from summer heat is best provided for by permitting the cooling breezes from the south and southwest to sweep unchecked through the farmstead. The dwelling should be so planned that the principal rooms will receive the benefit of these breezes.

A moderate amount of shade should, of course, be provided, especially near the house, since it prevents radiation of heat from the ground, which is perhaps a greater source of discomfort in the house than the direct rays of the sun on roof and walls.

### **ARRANGING THE BUILDINGS.**

#### **TYPE OF FARMING PRACTICED.**

Farm practice varies quite considerably in different parts of the country, and even in different parts of the same State, and the number, sizes, and uses of farm buildings vary with conditions as found on farms of different types, such as dairying, beef raising, general farming, fruit growing, etc. Conditions imposed by these variations govern, to a large extent, the arrangement of the farmstead. Careful consideration, therefore, should be given to the variety and scope of the industry likely to be attempted for some time in the future. As far as possible, the buildings should be so arranged and constructed as to provide for additions or changes to conform to increasing business or change of its character.

#### **ROUTING OF ROUTINE WORK.**

In laying out a farmstead plan, the route to be traveled in doing the chores should be borne in mind. The buildings should be so placed that in performing the routine work unnecessary walking is avoided. A farmer's time is valuable. Many factory managers have saved large sums of money yearly by merely eliminating a few steps in the daily routine of employees, or by cutting out unnecessary motions in performing a single piece of work. On the farm a great deal of time and unnecessary labor can be saved by carefully planning the various buildings and arranging them in proper relation each to the other.

If the average farmer were told that some time during the year he would find it necessary to take a trip of 150 to 200 miles, and that he would have to walk all the way carrying feed or milk or harness, he would object strenuously and declare that he would not have the time; yet hundreds of farmers are walking every year that much over and above the distance that would be necessary in performing routine work were their buildings efficiently arranged.

**THE PLAN ON PAPER.**

In order to study the arrangement of a farmstead or the planning of farm buildings to the best advantage, plans should be worked out on paper. When the approximate location of the farmstead has been decided and before any building or fencing is done, there should be prepared two plans—one of the whole farm, at a scale which will admit of ample and easily read legends and notes (100 feet to the inch answers the purpose very well), and one of the farmstead at a much larger scale, possibly 20 feet to the inch.

The first plan or plat should show the location of the farmstead, all roads and lanes, fields, lots, streams, drains (the location of which frequently is forgotten), ditches, fences, permanent natural objects, and all buildings in block form. The fields should be numbered or designated by letters, and the sizes indicated. This will be of assistance in determining the amount of fertilizer and seed needed, in calculating the returns from the crops, in the farm bookkeeping, and in keeping the record of each field, etc.

The plat should be made in ink on tracing linen or thin, tough paper, from which blueprints or, better, whiteprints, can be made. The original should be carefully preserved and the prints used for recording crop rotations, amount of fertilizer and seed used, and any other desirable data. Changes in layout can be made on the original, and a print of the original retained as a record.

The second, or farmstead plan, should be in much greater detail than the general farm plat, and therefore should be drawn at a larger scale. In this plan the several buildings should be shown with the general interior arrangements indicated; all minor accessories, such as watering troughs, feeding racks, scales, fences, gates, hitching rail, all lanes and driveways, walks, trees, shrubbery, etc., should be located upon the plan, each feature being placed with due consideration of its use and its relation to other features, as will be pointed out. It is an excellent scheme to cut out flat pieces of paper representing each structure. They should be made to the same scale as the plan, and should show the general arrangement of the interiors, so that the relations of each to the other may be studied. They may be shifted about into different positions until a satisfactory arrangement has been secured.

The working out of the farmstead plan on paper is of inestimable value to the farmer whose land is unimproved, for the careful study incident to its preparation may save him money and annoyance. The established farmer would do well to prepare plans of his farmstead and buildings and to study them carefully, with a view to remodeling or changing the location of some of his equipment in order to increase the efficiency of his plant.

**DESCRIPTION OF FOUR FARMSTEAD PLANS.**

It is quite possible that a given farmstead arrangement might be applicable to a number of farms so far as physical conditions are concerned, yet the location of the farm with relation to the highway has a very great influence on the farmstead plan. It is probably the greatest single factor determining the general disposition of the farm buildings. The importance of this factor is shown in the following layouts which represent four farms of like size and character—that is, a general farm of the Middle West—but unlike in their relation to the highway. In these examples it has been assumed that the land is unimproved and that it is practically level and well drained. In the first case, that of the farmstead east of the highway, the buildings have been placed at a crossroads for reasons explained on page 7 and shown in figure 2. In the other three layouts the farmstead is located on the highway in the center of a quarter section. In all of the plans the same buildings are used, except in a few instances when a different type is employed for the same purpose; in such cases reasons have been given. These illustrations are shown as possible solutions, demonstrating and emphasizing the principles which have been set forth.

**THE FARMSTEAD EAST OF THE HIGHWAY, FRONTING WEST.**

A farmstead located east of the highway lends itself most readily to the application of the general principles explained in the foregoing pages because of the relation between the prevailing winds and the highway. The application of these principles in arranging the buildings on a farmstead so located is illustrated in figure 4. Three views of a model of this layout prepared in the Bureau of Public Roads are shown on the front cover of this bulletin.

The location of the farm dwelling is the key to the whole layout, and therefore should be given first consideration. In this scheme the distance from the highway to the house is about 100 feet, sufficient to permit of an attractive setting and a measure of privacy, at the same time retaining an intimate relation to the highway. The house is readily accessible, and there is no great length of drive to build and keep in repair. The driveway is placed to the north of dwelling in order to avoid the annoyance of dust blowing through the house, to preserve an unbroken lawn on the south or living side, of the dwelling, and to provide a direct road from the highway to the farm buildings, which, because of summer winds, should be placed to the north, northeast, or east of the house.

It is not desirable that the heavier farm traffic pass too close to the house, but in bad weather it is a great convenience for the women folk to be able to step directly from a conveyance to the shelter of the entrance porch; hence a loop in the drive has been provided. It also serves as a turn around for visiting teams or cars.

The house and barn are the focal points of the plan, the smaller buildings, lots, and yards being arranged about them according to their utilitarian relationships.

An explanation of certain features of the house plan shown in figure 5 is desirable, since the general arrangement of the farmstead has a bearing upon them, and will show why each farmhouse should be planned with careful thought of the particular conditions of its location.

For reasons previously stated the driveway is placed north of the house, and the main entrance, protected from north winds by a porch, is located on the same side. The kitchen, so planned as to provide ample cross draft, is placed adjacent to the entrance hall, thus enabling the housewife to receive visitors without walking the length of the house, and so that while engaged in kitchen duties she may have the highway, entrance drive, and yard under observation and may readily detect any unusual occurrence.

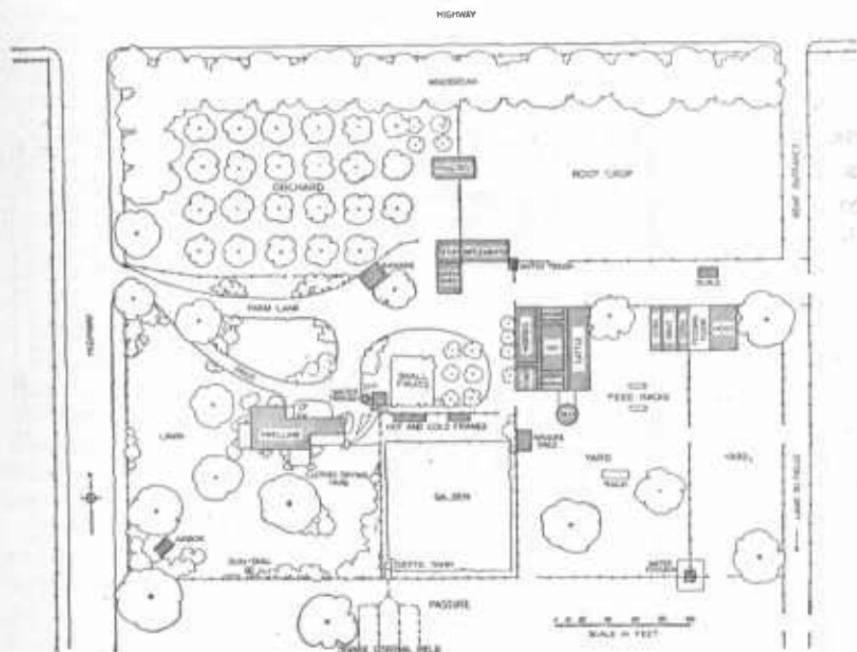


FIG. 4.—Farmstead lying east of the highway.

The laundry and washroom is arranged so that the men of the house or harvest hands coming directly from the barn or fields may wash up and pass into the dining room or onto the porch without entering the kitchen.

A combined ice and dairy house is attached to the dwelling, making it convenient for the housewife, who on many farms attends to the care of the milk. This location of the ice house makes it possible to incorporate a household refrigerator, thus saving the daily trips to a more or less distant ice supply.

The living portion of the house is so arranged that the best rooms have the benefit of the summer breezes, a pleasant outlook upon lawn and distant landscape, and protection from the cold winds of winter.

The barn is about 150 feet northeast from the house and directly on the road from the highway and the fields. The distance and

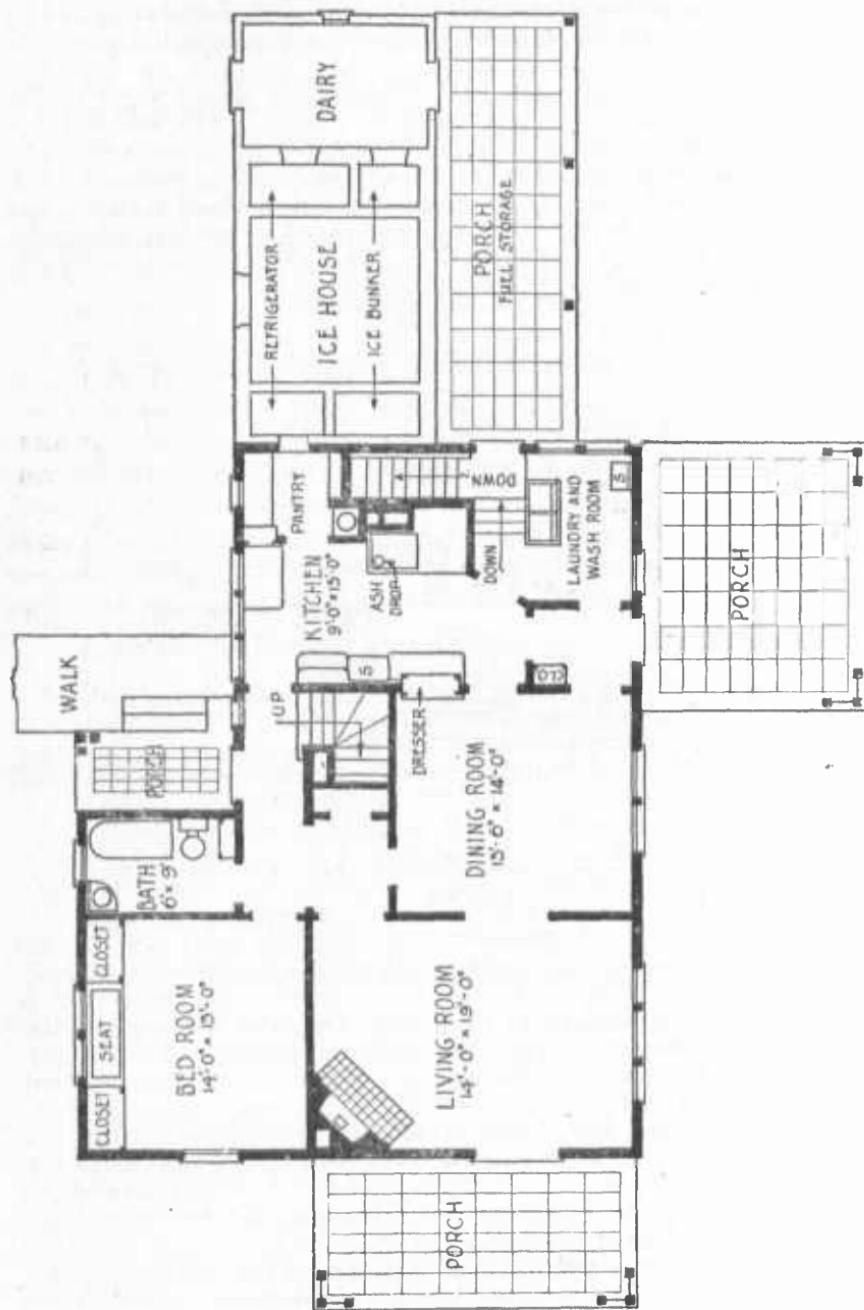


FIG. 5.—First floor plan of house shown in figure 4.

the direction render the dwelling reasonably safe from the annoyances of barnyard odors, and the chances of either building taking fire from the other are small. The type of barn to be used may be influenced by individual preference or particular requirements. Whatever type of barn is decided upon, it should be planned to fit the location. The barn indicated on the plan is of the shed type requiring a well-drained site, as the hay rests upon the ground, the mow extending up to the roof and over the grain bins located at either end. Hay may be mowed away from the north end of the barn, and the grain bins filled from outside. The axis of the barn is north and south, so that all the stock will have the benefit of sunlight during a part of the day. In summer the cool breezes will blow through its length. The horse stable is placed in the northwest corner of the barn, just across the lane from the implement and wagon sheds. This arrangement means a considerable saving of time in getting the teams ready for the day's work. The lane north of the barn and lots is fenced and provided with gates so that it may be used as a horse lot if desired.

Provision for a few milk cows is made in the southwest corner of the barn, near the cow pasture, which is reached through the cow lot. This leaves the east side for cattle. They get the full benefit of the morning sun, are protected from the cold winds, and are in close proximity to pasture, fields, and back lane, which are so arranged that the stock may be handled easily and quickly. By shifting the fences the lots may be arranged to suit other methods of stock management.

The location of the silo is convenient for either barn or yard feeding of the stock and is not far from the cow stable. It is placed far enough from the barn to permit filling a wagon from the chute. When the silo is being filled the engine and cutter may be placed so that teams coming from the fields can pull directly through the hog lot and stop in proper position alongside the cutter.

A manure shed is situated opposite the alley back of the horses and cows. It is a short carry from the barn with barrow or litter carrier and a short haul from the stored manure to the garden or fields. If it is desirable to haul the manure to the fields daily, the shed should be planned to shelter a spreader in such manner that the manure could be placed either in the spreader or in the pit, should bad weather prevent daily spreading.

To the east of the barn is a double cornerib and granary, providing for a reserve supply for the barn bins and a direct supply for yard feeding.

The hog lot adjoins the cattle yard, facilitating the common practice of allowing the hogs to follow the cattle. A hog house with two rows of pens is placed with its long axis north and south, so that each side will have sunlight during the day. In addition to the inside pens, there may be provided sun pens for outdoor exercise. A concrete feeding floor is shown between the crib and the hog house. Corn may be thrown from the crib directly onto the floor, which is protected by the two buildings and by a tight board fence on the north.

Platform scales are located in the lane, so that a wagon may be driven over the platform without going far out of the regular line of travel, and that cattle may be weighed readily.

The uses of the implement shed, wagon shelter, and shop are so closely related that they have been combined in a group and placed directly on the line of travel past the barn and close to the entrance to the horse stable. The wagon shelter is open on both sides, so that teams coming from the highway or fields may be driven under cover, unhitched, and taken directly to the barn, thus eliminating the backing of heavy equipment in daily use. As the implement shed is connected with the shop, all machinery put by in the shed may be overhauled and repaired under cover. A large piece of work can be run into the shop if necessary. The shop is of two stories, the upper floor being intended for use as an office, bedroom for extra hands, or seed corn storage. In case it is desired to use this room for corn, precautions should be taken to prevent rats and mice from climbing up walls by placing fire stops between the studs and by the use of galvanized-iron strips.

Just off the line of travel and convenient to the shop is a garage with doors at both ends, so that it may be entered from either direction, the necessity of backing being avoided.

Poultry should not be allowed to run at large over the farmstead. It is undesirable from the standpoints of good business and of sanitation. A henhouse, at the best, is none too clean and should not be placed near the dwelling. At the same time it should be convenient in case the women folk should be called upon to care for the poultry. Care should be taken that there is no danger of surface drainage from the chicken run contaminating the water supply. The orchard fence should be hog tight, and it costs but little more to make the inclosure hen tight, thus providing an excellent poultry run. To the east of the orchard is a small plot reserved as an emergency stock lot and for future buildings. With the house placed as in this plan, between the orchard and the reserve field, poultry in sufficient number for a farm of this kind will have ample room and a change of run. The small field also may be used for root crops.

The truck garden lies between the house and the barn. In this location it is convenient for the housewife when in need of fresh vegetables.

Sources of water supply vary on different farms and there are several methods of delivering water to the buildings and lots. A safe, dependable supply is of highest importance and the subject is fully covered and illustrated in Farmers' Bulletin No. 941, "Water Systems for Farm Homes," which may be obtained free from the Division of Publications, Department of Agriculture, Washington, D. C. In the plans illustrated in this bulletin it is assumed that the water is taken from a well and that a power pump is necessary or desirable. In this particular layout a well house sheltering the pump is placed just back of the dwelling, near enough for convenience in caring for the machinery yet not so close that the sound of the pump or engine would be annoying. The wellhouse also serves as a convenient place to keep garden tools.

Drinking water is provided for the stock at three points outside of the buildings—one just outside of the wellhouse, where teams may

be watered without going to the barn; one at the end of the implement sled, accessible from the yard, the lane, and the reserve field north of the lane, and one to serve the stock in the cattle lot, the hog lot, and the pasture.

Sewage drains to a sewage or septic tank located in the pasture near the fence and thence is distributed in shallow-laid drain tile through the disposal field. Further information on the subject is contained in Yearbook Separate No. 712, "Sewage Disposal on the Farm," which may be obtained from the Division of Publications, U. S. Department of Agriculture.

However closely a farm layout may approximate the ideal from the standpoint of efficiency and practical economy, it lacks completion unless it provides for the beautifying of the grounds with trees, shrubs, vines, and flowers.<sup>1</sup> A little planting judiciously placed will give to the most unpretentious abode that aspect of inviting restfulness which is essential to a real home. It will add to the selling price, or at least it will increase the chances of a profitable sale, for many properties have been sold to advantage on the strength of attractive appearance, even though lacking in other respects.

In laying out the driveways straight lines have been avoided. Graceful curves in walks and drives and informal plantings about the house are in better keeping with the life of the average farm home than are the effects produced by straight lines and plantings set out in geometrical patterns. The practical and esthetic often may be combined in some portions of the planting scheme. The trees about the house are intended to be both ornamental and useful. They frame the views from the house and provide attractive views of the buildings from the road. The shading of the lawn makes the house more comfortable in the summer and adds greatly to the pleasure of leisure hours.

An orchard is primarily a practical adjunct of the farmstead, but a well-kept orchard, especially when in full bloom, is a most pleasing sight. In this plan the orchard has been placed near the house, where it is sheltered by the windbreak.

In the plot between the house and the barn are fruit trees, berries, etc., sufficient to supply the household needs. In the barnyards are a few trees which will need protection from the stock, but the stock will be benefited by their shade.

If the selected site is lacking in mature foliage a few trees of rapid growth may be planted and cut out when more desirable varieties of slower growth have attained sufficient size.

#### THE FARMSTEAD WEST OF THE HIGHWAY, FRONTING EAST.

The arrangement of the farmstead west of the highway is more difficult on account of the desirability of providing south yards for stock. While this is not absolutely necessary in all cases, it is very desirable because buildings form the most effective windbreaks. In locations where it is necessary to await the growing of trees, shelter provided by the proper placing of the buildings is essential. A sug-

<sup>1</sup> The planting schemes indicated on the four layouts illustrated were planned by F. L. Mulford, Horticultural Investigations, Bureau of Plant Industry.

gested arrangement of a farmstead in this location is shown in figure 6.

The dwelling is the same as in the preceding layout and is in the same relative location, except that it is reversed from east to west, placing the living rooms toward the highway, and the kitchen, washroom, and icehouse and dairy toward the barn. The drive is in the same comparative location as before. The barn is directly north of the house, thus avoiding obnoxious odors in the dwelling, and is far enough away to allow a reasonably large barnyard, protected from the north and west, without being too much in evidence from the house. The yard is separated from the road by a small pasture,

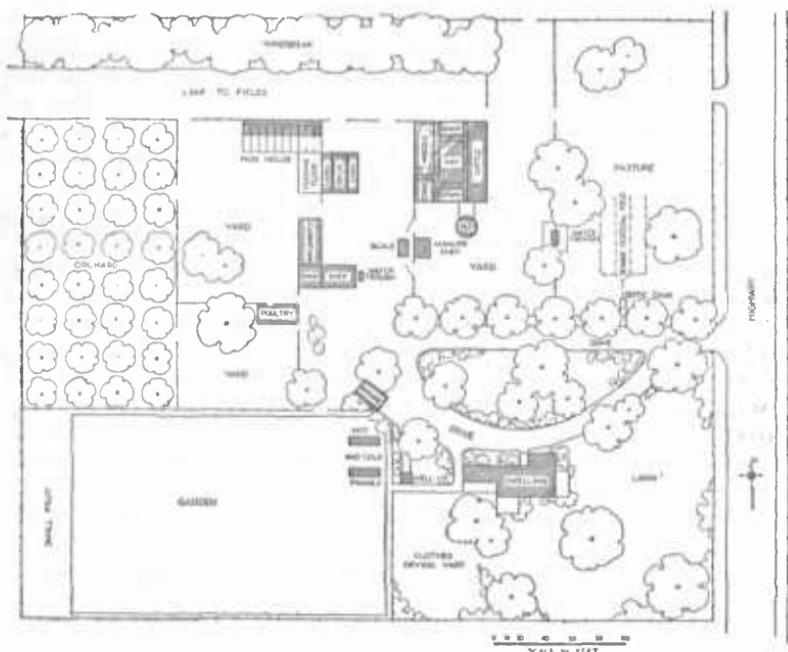


FIG. 6.—Farmstead lying west of the highway.

which can be used as a back lane to the highway in such instances as when stock is being driven to market, making it unnecessary to turn them loose over the drive and lawn.

The yard is screened from the house by shrubbery and trees. The location of the stock in the barn with regard to the points of the compass is the same as before, the cattle in the east side, the cows in the southwest portion and the horses in the northwest. The combined implement shed, wagon shelter, and shop is convenient to the horses and to the garage directly to the south.

The double corn crib is placed adjacent to the hog-feeding floor and is convenient to the barn. It is located so that a team can be driven through it, thus facilitating yard feeding of the cattle.

The hog house and yard, west of the barn, are so situated that the hogs may be turned into the orchard when desirable. In this plan a single-row house has been substituted for the double-row house used in the preceding example, because its entrance is more convenient

to the barn and the building, being longer, affords better protection to the yard. The single-row house is not as economical as the double-row house because of the greater alley space, but in this case its use seems advantageous. The hog yard does not adjoin the cattle yard, but they are connected by a lane, making it possible conveniently to transfer the hogs to the cattle feed lot. The location of the scales south of the barn and in a line with the fence, permits the use of double gates, which adds to the convenience of weighing cattle and makes the scales readily accessible for almost any purpose, particularly the weighing of produce hauled away from the farm or the checking of weights of supplies. Its location is not ideal for the weighing of corn from the field before storing in the corn crib, as it involves turning around and driving back a short distance, but the weighing of corn from the field is only one of the many uses for the farm scales and it is hardly possible to attain, in any one scheme, an arrangement which is ideal in every respect. Good planning lies in the weighing of the various advantages and disadvantages and the selection of those best suited to the purpose.

The poultry house and yard, situated south of the hogs, is convenient to the dwelling. The yard adjoins the orchard, making it possible to secure additional run.

The well house is between the dwelling and garden. Watering troughs are provided at two points outside the buildings; one at the end of the open shed and one between the cattle yard and pasture.

The septic tank and a sewage-disposal field are located north of the drive in the pasture.

A windbreak is indicated along the north side of the farmstead. The orchard on the west affords protection from west winds and is itself protected by the windbreak on the north.

#### THE FARMSTEAD NORTH OF THE HIGHWAY, FRONTING SOUTH.

The solution of the farmstead layout north of the highway, shown in figure 7, is similar in general arrangement of the buildings to the one west of the highway. The dwelling shown on this plan is the same as the preceding layout, but the plan has been turned, with the long axis north and south, in order that the entrance may be accessible from the drive, and that the kitchen, wash room, ice house, and dairy will be in proper relation to the outbuildings. This shows the effect of location on the house plan. The interior of the house would have to be redesigned in order to obtain desirable exposure for the principal living rooms.

The prevailing breezes from the south and west would tend to blow dust from the highway into the house. For this reason it is set back further from the road than in the other farmstead layouts, the distance in this case being about 160 feet. In some instances it might be advisable to place the house still further from the road, especially on unprotected sites.

The driveway, with a loop turn-around, is laid out to the east of the house in order to minimize the nuisance of dust from that source. An unbroken expanse of lawn to the south and west of the house permits the development of an attractive outlook from the living rooms.

As the barns are placed north of the house, southerly or westerly winds will carry odors away from the farm residence. The arrangement of the barns and yards is similar to that in the preceding plan. It is sometimes difficult to arrange the lots or yards to the south of the buildings without sacrificing something of convenience or economy. It is thought by some that south yards are not of sufficient importance to warrant any loss of convenience in general arrangement; this may be true in southern latitudes, but in any case individual judgment must be used. In these four plans a southerly ex-



FIG. 7.—Farmstead lying north of the highway.

posure of yards has been indicated in order to show that they may be secured, no matter in what direction the farmstead may face.

A wind-break on the north and the orchard on the west protect the farmstead from winter winds. The garden is located so as to give it the desirable exposure and yet to have it reasonably convenient to the house and barns.

The cattle yard is separated from the highway by a small pasture which can be used as a back lane, as in the preceding plan.

The location of the well, southwest of the house, is assumed to render it free from contamination by drainage from the poultry or cattle yards. The pump and engine or windmill need not necessarily

be placed directly over the well and hence are located in a pump-house between the house and barns, where they are readily accessible.

Sewage from the house is disposed of through a septic tank and distribution field located in the pasture east of the house.

#### THE FARMSTEAD SOUTH OF THE HIGHWAY, FRONTING NORTH.

The farmstead located south of the highway lends itself readily to a compact, convenient arrangement as illustrated in figure 8. But in the planning of the layout there arises the problem of the dwelling which should present an attractive exterior to the highway on the north and yet have living rooms with the desirable south and

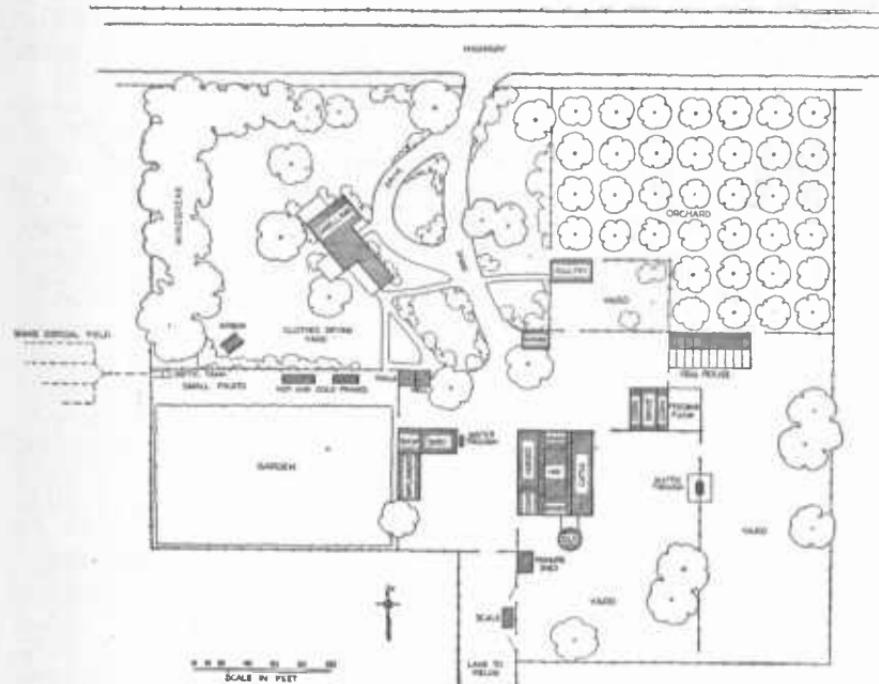


FIG. 8.—Farmstead lying south of the highway.

west exposure. There are a number of solutions depending upon the requirements of the family and the type of building. The average small square box of a house does not lend itself to this situation. One solution is indicated in this layout in which the same house used in the other plans is placed at an angle to the road. The advantages of turning this particular house in this way are apparent. The living room looks out upon the highway, but at the same time is made cheerful by sunlight from the west and south. The dining room faces the southwest. The kitchen commands a view of the highway and the entrance drive and yard are under the observation of the housewife in the kitchen. The rear porch, adjacent to the wash room and dairy, may be conveniently entered from the barns. Generally the best results are obtained by planning the house and

other buildings for the particular site selected for them having in mind the general considerations that have been illustrated.

The main entrance drive affords direct access to the outbuildings, yet is laid out with the pleasing effect of curved lines and the avoidance of the dust nuisance in view.

Here again, the location of the barn is such as to protect the house as much as possible from odors from the barnyard. The barn is of the same type as has been used in the other layouts and the same relation of the interior arrangements to the points of the compass has been retained. The adjacent hog and cattle yards permit of a convenient hog and cattle feeding arrangement similar to that in the farmstead east of the highway. The single-row hog house has been used again here for the reasons mentioned in the description of the farmstead west of the highway. The orchard serves the triple purpose of providing a windbreak for the yards, a poultry run and a supplementary hog run.

The relation of the implement shed, wagon shelter, and shop to the house and stable and to the lane leading to the fields is such as should be sought for. The scales, between the two cattle-yard gates, serve for weighing cattle, hogs, and corn as it comes from the fields.

Water-supply and sewage-disposal systems have been indicated with the precautions against contamination of the water in mind.

In conclusion, let it be understood that the four layouts illustrated are not schemes designed to fit all farms similar to them in character and location. They are presented merely for the purpose of making clear the application of general principles. Every farm has its own natural conditions and every farmer his individual methods and practices, and these conditions will influence the design of the individual buildings and the general grouping.

Complete working drawings for the following buildings indicated in the four plans may be obtained by writing to the Division of Rural Engineering, Bureau of Public Roads, United States Department of Agriculture, Washington, D. C., referring to the serial number of the building or buildings desired:

Dwelling, serial No. 540-1-2 (652-3).

Barn, serial No. 612-13.

Silo, drawings and bills of materials for various sizes and types.

Implement Shed, Wagon Shelter and Shop, serial No. 570.

Corn crib, serial No. 521.

One-row hog house, serial No. 683.

Two-row hog house, serial No. 680.

Manure shed, serial No. 1095.

